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# **Adventures in Technology = Options in Math and Science**

## **FINAL REPORT**

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**Activities for July 9, 1996 to July 8, 1997  
Grant Number: NAG-1-1860**

## **ADVENTURES IN TECHNOLOGY = OPTIONS IN MATH AND SCIENCE NASA GRANT NAG - 1 - 1860**

*This report provides information on the Pipeline Precollege Program supported by NASA Grant NAG-1-1860 to Thomas Nelson Community College for the period July 9, 1996 through July 8, 1997. The program is titled Adventures in Technology = Options in Math and science.*

### **Progress and Success:**

ATOMS is a well-established program that promotes science, math, engineering and technology (SMET) interest at the middle school level. Since its inception the ATOMS program has focused on creating a diverse pool of academically-prepared students. Our targeted population is "the backbone" of the future's workforce, the average achiever. Also, minority and female populations have been sought as they frequently self-select out of the challenging mathematics and science courses offered in high school. A series of SMET interest interventions is provided for approximately 2600 students annually. Evaluations document an increase in the students' interest in and positive attitudes toward science and math as a result of the ATOMS interventions. In addition, these students are more likely to enroll in higher level math and science courses than students who have not had the interventions. Finally, ATOMS provides gender- and ethnically-diverse role models who are currently working in financially-rewarding careers in science and technology.

### **Community Support:**

The ATOMS program enjoys broad community support and exposure. Through the initiative of Thomas Nelson Community College and NASA, a loyal constituency has been created that is strengthened each year. The premier high-technology employers on the Peninsula are active partners, making available talented, young, enthusiastic employees to serve in the programs. Approximately 150 technicians--scientists and engineers from **NASA Langley Research Center, Thomas Jefferson National Accelerator Facility, Siemens Automotive, Canon Virginia, Inc., Newport News Shipbuilding, and Anheuser-Busch, Inc.** eagerly re-enlist each year.

All five Peninsula public school divisions - Newport News Public Schools, Hampton City Public Schools, Poquoson City Public Schools, Williamsburg/James City County Public Schools, and York County Public Schools - now participate. New Horizons Regional Education Center, a multi-school system career and technical training center serving secondary students, joined the partnership in 1993. Teachers, guidance counselors, and administrators in 21 middle schools (with the addition of two new schools in 1996-97) support the program at

their schools. Each partner is represented on the ATOMS Advisory Committee. The combined talent and commitment of these individuals and organizations create the synergy that sustains the program.

Specific activities for 1996-1997 are summarized below:

| <b>Time Frame</b>    | <b>Activity</b>  | <b>Participants<br/>(#)</b> |
|----------------------|--|-----------------------------|
| 7th Grade,<br>Fall   | <i>Interactive career awareness presentation-</i> students listen to stories, brainstorm in small groups the specific career responsibilities and benefits and begin to formulate their personal vision for their goals.   | 1077                        |
| 7th Grade,<br>Spring | <i>Industry team presentation-</i> students participate in hands-on activities, team members each talk about their personal experiences with education and job searches; they answer questions about their jobs.   | 1653                        |
| 8th Grade,<br>Fall   | <i>Site visits-</i> students tour the industry of the team that visited them in the preceding spring; students see the team members in their labs or work stations and are able to talk to them and ask questions about the job site. Additional related activities are usually provided to the students.  | 1289                        |
| 8th Grade,<br>Spring | <i>Campus visits-</i> students visit Thomas Nelson Community College or New Horizons Technical Center. Students are taken on a tour which includes several different activities, such as a career center presentation, science and technology lab presentations. Students are given curriculum information at each area and are given the opportunity to ask questions and participate in hands-on activities. | 1139                        |

## **Evaluation**

All five school systems on the Virginia Peninsula participate with a total of 21 middle schools in the ATOMS program. More than 20,000 students have participated in the pipeline programs since 1989. The focus has been on creating a diverse pool of academically-prepared students.

The number of minority students participating has steadily increased, reaching 49.1% in 1997. Female participation has remained steady at 55.4%. Female and minority participation will continue to receive high priority.

The programs were evaluated by means of student, teacher, and counselor surveys. Questionnaires are distributed immediately after each intervention. The respondents are asked questions concerning the appropriateness of the activity, their interest level and change in opinion after the intervention. More than 90% of all students rate each activity as "Interesting" to "Very Interesting." Almost 70% of students indicate they intend to take additional higher level mathematics courses in high school after participating in the Site and Campus Visits. Between 70 and 80% (79.3% after the Career Awareness Activity, 72.0% after the Industry Site Visit) of students indicated they have a better understanding of why math and science are important school subjects after participation in each ATOMS activity.

Comparisons in scores from the Iowa Test of Basic Skills have been made between the ATOMS students and the remainder of the seventh and eighth grade populations. ATOMS students' math and science achievement scores from the fifth grade were near the district average. After participating in ATOMS, students scored significantly higher than their peers. ATOMS students enrolled at TNCC have been identified and are being tracked further for achievement.

## **Dissemination**

The ATOMS director has given presentations to the WEPAN (Women in Engineering Program Advocates Network) conferences in 1995, Denver, CO and at TNCC, WEPAN Regional Seminar, 1996, and the Mathematics Association of America in the Spring of 1995. The interest of MAA was in the average achiever which is the special target group of the ATOMS program. Papers will be submitted to journals such as *Teacher*, *Math Teacher*, and *National Biology Teachers*.

Final reports for the yearly summary of the ATOMS program are distributed widely to the community. Activities and results of this project have been reported in the local media.

## **ATOMS Advisory Board**

Dr. James Tucker, Co-chair  
Director of Middle Schools  
York County Schools

S. Stewart Harris, Co-Chair  
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NASA Langley Research Center

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